NON-PUBLIC?: N
ACCESSION #: 9111260245
LICENSEE EVENT REPORT (LER)

FACILITY NAME: CRYSTAL RIVER UNIT 3 (CR-3) PAGE: 1 OF 04

DOCKET NUMBER: 05000302

TITLE: WIRING PROBLEM CAUSES TRANSFORMER BREAKERS TO OPEN ACTUATING THE
EMERGENCY DIESEL GENERATOR
EVENT DATE: 10/20/91 LER #: 91-010-00 REPORT DATE: 11/18/91

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: 5 POWER LEVEL: 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: W. A. STEPHENSON, NUCLEAR SAFETY SUPERVISOR TELEPHONE: (904) 795-6486

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On October 20, 1991, Crystal River Unit 3 (CR-3) was in MODE 5 (COLD SHUTDOWN) for a scheduled maintenance outage. At 1443 the breakers for the offsite power transformer opened, disconnecting the engineered safeguards (ES) busses from the offsite power supply. Decay heat cooling was interrupted for less than a minute while the emergency diesel generator (EDG) loaded the ES bus and operators restarted the Decay Heat Pump (DHP). Upon starting the DHP, a purification relief valve lifted causing a drop in pressurizer level. Operators quickly identified the source and isolated the purification system. At 1447, the operators manually energized the remaining ES bus via the CR-3 startup transformer. This event was caused by a pre-existing wire installation which inadvertently applied 115V AC to the CR-3 battery bus. The erroneous wire has been removed. The associated breaker relays have been replaced

with less sensitive relays to minimize the possibility of similar events in the future. Information will be provided to all operators concerning this event. The associated Emergency Procedure (EP) will be revised to address restarting the DHP.

END OF ABSTRACT

EVENT DESCRIPTION

On October 20, 1991, Crystal River Unit 3 (CR-3) was in MODE 5 (COLD SHUTDOWN) for a scheduled maintenance outage. The reactor temperature and pressure were 100 degrees F and 50 PSI, respectively. The reactor coolant system AB! was filled with a steam bubble on the pressurizer. Core cooling was provided by decay heat removal train "A" BP!. Steam generator "A" AB! was available for backup core heat removal via emergency feedwater BA!. The "B" decay heat removal train was out of service for planned maintenance. Th
"A" decay heat train was aligned to
the purification system CB! to provide purification flow. The Reactor Building (RB) NH! equipment hatch was removed and RB purge was in progress. Power to the engineered safeguards busses (ES) EB! was being supplied from the offsite power transformer EB,XFMR!. Balance of plant equipment was being supplied from the CR-3 startup transformer EB,XFMR!. The "A" emergency diesel generator (EDG) EK! was available and the "B" EDG was out of service for maintenance and modifications.

At 1443 on October 20, 1991, while performing a modification test, the breakers EB,BKR! for the offsite power transformer opened, disconnecting the ES busses from the offsite power supply. The undervoltage on the ES busses caused the "A" decay heat train, its cooling systems and other equipment powered by the ES busses, such as control complex ventilation VI!, RB purge and fans VA!, and isolation valves CB,ISV! for the purification system filters and demineralizers, to automatically disconnect from the busses and stop. The balance of plant equipment on the CR-3 startup transformer was unaffected.

Six seconds after the breakers for the offsite power transformer opened the undervoltage on the ES busses caused a start signal to be sent to the EDGs, per design. Eight seconds later the undervoltage on the "A" ES bus cleared when the "A" EDG output breaker closed energizing the associated bus. The "B" EDG was out of service, therefore, the "B" ES bus remained de-energized.

Operators next began to manually restart the stopped equipment. Less

than a minute after the output breakers opened the operators re-initiated decay heat removal via the "A" decay heat system.

Upon starting the Decay Heat Pump (DHP) BP,P!, the purification relief valve CB,RV! lifted causing a drop in pressurizer AB,PZR! level. The high pressure in the purification system was caused by the cessation of flow through the purification system such that the purification inlet header experienced DHP discharge pressure which exceeded the relief valve setpoint. When starting the DHP, the licensed control room operator failed to recognize that the decay heat to purification system isolation valve was open. This lineup was different than the normal operating procedure which requires that the isolation valve be closed before starting the pump. The applicable EP for EDG actuation did not address restarting the DHP since the procedure predominantly addresses conditions during power operations when the decay heat system is not in service. Operators quickly

recognized the pressurizer level change, identified the source as the purification relief valve, and closed the isolation valve between the decay heat and makeup systems.

At 1447, the operators manually energized the "B" ES bus via the CR-3 startup transformer. The remaining equipment that had stopped was restarted without further complications.

At 1520, the operators transferred the "A" ES bus to the CR-3 startup transformer in preparation for securing the "A" EDG.

At 2030 on November 13, 1991, the offsite power transformer was returned to service.

CAUSE

The offsite power transformer breakers opened due to a pre-existing wire installation which inadvertently applied 115V AC to the CR-3 "A" battery bus EJ!. The "A" battery provides the 125V DC primary control power to the offsite power transformer breakers. The effect of the 115V AC in the breaker control circuits energized the interposing relays EA,RLY! which, in turn, caused the transformer breakers to open.

A modification test aided in establishing the conditions necessary to initiate this event. The objective of the modification test was to insure the proper alignment of the auxiliary building exhaust flow control dampers VF,DMP! with various fans in operation and/or shutdown.

Re-performance of the modification test with feeder breaker disconnect open, while monitoring the transformer breaker DC control power, resulted in the breakers opening again and indicated AC on the breaker DC control voltage. Further investigations revealed a wire connected the AC circuit being tested with a DC circuit. This wiring error appears to have existed since original plant construction and was not reflected on the vendor drawing provided with the original equipment. Review of the modification test indicates the modification test procedure was adequate and was being properly performed.

The AC applied to the breaker control circuit energized the interposing relays. The interposing relays are intended to provide manual control of the transformer breakers from the control switch in the main control room. The interposing relays are a low energy, fast acting relay which make this circuit sensitive to DC grounds and the type of disturbance experienced during this event.

EVENT EVALUATION

The EDG actuated as intended and the output breaker closed within 10 seconds as designed. Had the EDG failed to start, the "A" ES bus could have been manually powered from the CR-3 startup transformer. Recent efforts to provide additional assurance of adequate backup power during shutdown were key to avoiding the loss of the balance of plant equipment and thus preventing a more significant transient.

It is unlikely that this event would have occurred during power operations because the event requires a unique and seldom experienced ventilation lineup. This is also the reason that this problem has not been identified despite the existence of the wiring problem for several years. This event requires all auxiliary building fans VF! be shutdown and the control complex exhaust fans VI! be operated in slow speed. Shutdown of all the auxiliary building fans is minimized due to the Technical Specification requirements and for operational reasons.

CORRECTIVE ACTION

The improperly installed wire has been removed. Additionally, the interposing relays have been replaced with less sensitive relays to minimize the possibility of similar events in the future. The replacement relay characteristics are such that operation is insured during low battery voltages and it offers greater reliability during DC control power perturbations. In subsequent testing, AC was intentionally applied to the CR-3 "A" battery bus and the new interposing relays did

not pick up.

To address lifting the purification system relief valve, information will be provided to all operators concerning this event. Additionally, the EP for EDG actuation will be revised to address restarting the DHP.

PREVIOUS SIMILAR EVENTS

There have been four previous events involving the loss of an offsite power source. This was the first event involving the loss of the offsite power transformer due to AC applied to the DC control circuit.

ATTACHMENT 1 TO 9111260245 PAGE 1 OF 1

Florida
Power
CORPORATION

CrystaL River Unit 3
Docket No. 50-302

November 18, 1991
3F1191-10

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: Licensee Event Report (LER) 91-010

Dear Sir:

Enclosed is Licensee Event Report (LER) 91-010 which is submitted in accordance with 10 CFR 50.73.

Sincerely,

G. L. Boldt
Vice President
Nuclear Production

WLR:mag

Enclosure

xc: Regional Administrator, Region II

Project Manager, NRR
Senior Resident Inspector

A Florida Progress Company

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